State of Illinois
ENVIRONMENTAL PROTECTION AGENCY

Jay Patel

Mary A. Gade, Director

1701 First Avenue, Maywood, IL 60153

MEMORANDUM

DATE: January 27, 1997

To: Bruce Carlson, DLC

FROM: Chris Kallis, DWPC-FOS CK

SUBJECT: R. Lavin & Sons
North Chicago Refiners & Smelters - IL0002755
Legal Support Inspection

Attached is a copy of a LSI report on the above named facility dated November 15, 1996. This facility has not been able to meet final technology-based effluent limits as mandated by the consent order. The reissued NPDES permit may grant compliance relief since effluent limits will no longer apply to outfalls to Pettibone Creek. The permit conditions are based on information provided in the permit application, a first flush study provided by Lavin and USEPA guidance concerning storm water associated with industrial activity. The following inspection findings should be noted:

- Lavin's first flush study "suggests" that the "storm water runoff" from this facility has had no effect on water quality in the creek. However, Agency data confirms that Lavin is a major contributor to the contaminated sediment in the creek. The concentration of contaminated sediment may be considered a violation of water quality standards (Section 302. 203).

- In November, a leak in the industrial wastewater system, resulted in unmonitored discharge of process waste water to waters of the State. This is a violation of the Illinois Environmental Protection Act, the Consent Order and Clean Water Act based on the provisions in federal statute 40 CFR 421.63. The circumstances indicated apparent violations of Title 35, Part 306, Section 302 (Systems Reliability). The event also showed serious deficiencies in Lavins' self monitoring and pollution prevention program.

- The NPDES Permit application and the proposed permit does not include contaminated ground water as a contributing waste stream for Outfall 002. Evidence and inspection observations have indicated that highly contaminated groundwater is infiltrating the ditch. The first flush study also confirms that the 002 ditch contains "ground water from the shallow bearing unit". Unless this problem is remedied Lavin could be found in further violation of its NPDES Permit and the Illinois Environmental Protection Act. Furthermore, such contamination could not be remedied by best management practices and a storm water pollution plan.

- So far any attempts at Pollution Prevention have not been successful based on discharge monitoring report data. Lavin officials claim that the plan is to install more equipment to minimize slag piles coming into contact with storm water. The first flush study has suggested that best management practices have already been achieved. It states that the collected data on Outfall 004,"suggests that the benefits of Best Management Practices for storm water control likely have already been achieved. Additional measures would result in very little improvement in runoff quality and probably be cost ineffective. There were also less significant improvements in Outfalls 002 and 003".

cc: DWPC/ FOS/ RU
DWPC/ Blaine Kinsley
DWPC/ CAS
DWPC/ Bob Schacht
DLPC/ James Moore
DLPC/ Judy Triller
CK 01/27/97

CK: ck

Form Approved
OMB No. 2040-0057
Approval Expires 8-31-98

Section A National Data System Coding (i.e., PCS)

Transaction Code	NPDES	yr/mo/day	Inspection Type	Inspector	Fac Type
1 N 2 5	3 I L 0 0 0 2 7 5 5 11	12 9 6 1 1 1 5 17	18 C	19 S	20 2

Remarks: C

21 66

Reserved	Facility Evaluation Rating	BI	QA	Reserved
67 69	70 1	71 N	72 N	73 74 75 80

Section B: Facility Data

Name and Location of Facility Inspected (For industrial users discharging to POTW, also include POTW name and NPDES permit number)	Entry Time/Date	Permit Effective Date
R. Lavin & Sons North Chicago Refiners & Smelters 2028 Sheridan Road North Chicago, Lake County, 60064	09:00 a. m. 11/15/96	02/22/96
	Exit Time/Date 12:30 p.m. 11/15/96	Permit Expiration Date 11/01/90

Name(s) of On - Site Representative(s)/Title(s)/Phone and Fax Number(s)	Other Facility Data
George Lennon Assistant Plant Manager 847/689-1600 Dennis Caldwell Environmental Coordinator 847/689-1600	
Name, Address of Responsible Official/Title/Phone and Fax Number Benntt Lavin Executive Manager 312/847-1800 3426 South Kedzie Chicago , Illinois	Contacted [ ] Yes [X] No

Section C: Areas Evaluated During Inspection (Check only those areas evaluated)

X	Permit	X	Flow Measurement	X	Operation & Maintenance		CSO/SSO (Sewer Overflow)
X	Records/Reports	X	Self-Monitoring Program		Sludge Handling/Disposal	X	Pollution Prevention
X	Facility Site Review	X	Compliance Schedules		Pretreatment		Multimedia
X	Effluent/Receiving Waters	X	Laboratory	X	Storm Water		Other:

Section D: Summary of Findings/Comments (Attach additional sheets if necessary)

Name(s) and Signature(s) of Inspector(s)	Agency/Office/Phone and Fax Numbers	Date
Chris Kallis	IEPA / Maywood Office / 708-338-7900	January 27, 1997
Chris Kallis		Jan 27, 199
Signature of Management Q A Reviewer	Agency/Office/Phone and Fax Numbers	Date
		1-27-97

EPA Form 3560 - 3 (Rev. 9 - 94) Previous editions are obsolete.

State of Illinois
ENVIRONMENTAL PROTECTION AGENCY

Mary A. Gade, Director

1701 First Avenue, Maywood, IL 60153

INSPECTION NOTES

FACILITY NAME:	R. Lavin & Sons Inc. North Chicago Refiners & Smelters
NPDES PERMIT NO.	IL0002755
BASIN CODE:	Q
INSPECTION TYPE:	CEI - LSI
DATE OF INSPECTION:	November 15, 1996
INSPECTED BY:	Chris Kallis, DWPC-FOS
INTERVIEWED:	George Lennon, Assistant Plant Manager Dennis Caldwell, Environmental Coordinator Everett Biegalski, Lab Technician

GENERAL INFORMATION

Responsible Officials:

The name of the principal executive officer is Bennet Lavin, President. His authorized agent is Dennis Caldwell, the Environmental Coordinator, who can be reached at 708/689-4300. Mr. Caldwell is the Class K operator.

Plant Location:

This facility is located at 2028 South Sheridan Road in North Chicago, Lake County, Waukegan Township. The site occupies a 17.5-acre parcel of land. It is in the northwest corner of Section 4, T44, R12E.

Receiving Waters:

All four of the outfalls enter Pettibone Creek via a storm sewer. The main area storm line runs south along Sheridan Road. According to schematics, it appears to start in the vicinity of the Lavin's 21st Street entrance where it receives effluent from 004. The 002 and 003 discharges appear to enter an eight-inch line, which in turn enters a storm sewer on 22nd Street. This line runs east into the Sheridan Road line which runs south into Pettibone Creek. At the point of entry to Pettibone Creek, the only upstream dry weather flow that has been documented, is from a non contact cooling water discharge from Fansteel.
In 1983 a report was prepared for this Agency by Northeastern Illinois Planning Commission titled "An Evaluation of Storm Water Pollutant Loads to Lake Michigan from Lake County ". It included supporting documents that showed about 784 acres of drainage are tributary to Pettibone Creek upstream of the Lavin/ Sheridan Road outfall, much of which is from no permeable areas.

After effluent enters the creek, it crosses Sheridan Road where it enters the Great Lakes Naval Training Center. On the Navy property, both the west branch and the south branch of Pettibone Creek enter the main stream. The west branch appears to start near the base's main gate from a major drainage tile from the west. The south branch starts about two miles downstream in an area near Green Bay Road. Pettibone Creek enters the Great Lakes Naval Training Center Harbor about a quarter of a mile east of the south branch entry into the main stream. Both the inner and outer harbors at Great Lakes Naval Training Center are highly used recreation areas (fishing, boating, etc.) with a bathing beach just to the north.

Two studies performed by the U.S. Navy have supplied data on the harbor. Two sampling studies (one in 1988 and the other in 1989) show sediments in the inner harbor to have extremely high concentrations of lead, copper and zinc. Using the guidelines for classifications of Great Lakes harbor sediments (USEPA-1977), the inner harbor and parts of the outer harbor can be determined to be heavily polluted with copper, zinc and lead. High concentrations of these metals have been confirmed by earlier studies.

In support of this data, the BOW Planning section performed a water quality study on June 6, 1990. It showed both adverse effects to water quality resulting from Lavins' discharge, especially in the sediment. The amounts of zinc, copper and lead in the sediment downstream from Lavin were shown to be highly elevated.

On April 20, 1992, a preapplication meeting for proposed boat basin and outer harbor dredging was held at Great Lakes NTC. More data was submitted as well as a summary of data already submitted. The data also included some water quality data taken at three points. One point was the inner harbor. Another was the outer harbor near the inner harbor mouth. The third was the actual outer harbor. Analysis results showed that Title 35 Water

Quality Limits were exceeded, including the parameters of arsenic, copper, mercury and lead. In a letter dated October 4, 1993, from Bruce Yurdin to the Navy, it was made clear that the disposal of excavated material must be disposed of in accordance with Subtitle G requirements. Concern was also expressed about releases of contamination if such a project was done.

According to the Illinois Water Quality Report (1989-1991) the Great Lakes NTC Harbor is classed as non supportable for aquatic life and considered very poor quality on its assessment. A consumption advisory is issued for Lake Trout, Chinook Salmon, Brown Trout, Carp and Catfish. The pollutants of concern are elevated levels of copper, lead and zinc. It should be noted that the Navy drinking water intake is within a mile of the harbor.

Plant Description:

The subject site is engaged in secondary smelting and refining of nonferrous metals (SIC 3341). The facility processes pure copper, zinc, tin and babbitt (which is an alloy composed partially of antimony) and recycles brass, bronze and scrap copper. Process operations consist of recycling and reusing water for direct ingot cooling, smoke spray towers, flue trail dumpers, press heat exchanges, zinc die cast molds, cupola water jackets and cupola slag granulation. Under ideal conditions this water is to be recirculated back into the system. However, due to a hydraulic overload caused by both precipitation and process difficulties, the reservoir can and has overflowed into a storm sewer on the property. This outfall is listed as Outfall 001. This outfall enters the latter half of a two-stage ditch on the property. This ditch has the ability to overflow to the storm sewer tributary to Pettibone Creek. This overflow is designated as Outfall 002, which in addition to storm water would include any process water from Outfall 001.

Part of the drainage tributary to Outfall 002 includes warehouses I and II and the concentrator building. This is the location of most of the hazardous waste piles and problem accumulation areas. The area around the furnace building is also a source of pollutants. Another waste source to this ditch is apparently leachate and groundwater coming from an area that has been filled. The ditch has been shown to be heavily contaminated.

To limit Outfall 002 discharges, portable pumps have been installed to recirculate the combined process water and storm water runoff back into the process water system. Storm water is normally pumped to a two million-gallon storage tank on the southern portion of the property. This unit was constructed under Permit Number 1990-EN- 0190.

From here the storm water is pumped back either into the process or to the no-discharge wastewater treatment system. The unit has a DAF of 1.4 MGD and a DMF of 2.8 MGD and is designed to totally recirculate. The process consists of two 255,000 gallon capacity tanks

used for storage, suspended solids settling, cooling and oil skimming and removal. The unit also includes a filter press and filtration unit. Effluent is normally sent to the 001 reservoir for storage and treatment.

There are two additional outfalls tributary to the waters of the state. Both outfalls reportedly only receive storm water runoff at this time. The 003 manhole is located on the southeast section of the property, just south of the 002 discharge. According to schematics it enters the same manhole as 002 before entry into the storm sewer. This outfall collects runoff from the hazardous waste storage area. Much of the flow runs very close to the 002 ditch and has a furthermost upstream manhole located near the problem leachate area. 004 is located in the northeast section of the property near the parking lot entrance. It separates into two separate entries into the North Chicago storm sewer. Schematics show this outfall receives the majority of the area runoff. This includes the railroad receiving dock.

Background Information

In the late 19th century, the area south of the E.J.E. Railroad, north of 22nd Street, west of Sheridan and east of Pettibone Creek belonged to Lanyon Zinc and Paint Company. Sometime before 1921, the land was subdivided. The Vulcan Louisville Smelting Company, which was a smelting operation occupied much of the property now owned by Lavin. The land was subdivided into three parcels just before World War II. Fansteel bought up the south end for their plant to manufacture Tantalum. The property to the west remains undeveloped and held by the Northern Trust Bank in Lake Forest. North Chicago Refiners and Smelters bought the remaining property in the early Forties.

Historically, this facility was unable to meet both applicable effluent and water quality limits. As a result an enforcement case was initiated by DWPC. Due to the nature of the storm water runoff the case was referred to DLPC, who determined the facility to be in violation of Subtitle G - Waste Disposal Regulations. A multimedia enforcement case was developed. It includes both sediment and water quality sampling. During litigation, two construction permits were applied for by Lavin & Sons. On March 7, 1990, a construction permit was issued (permit number 1990- EN-1990) for the two million gallon storage tank. On May 2, 1990, a permit to construct (1990- EN-0583) was issued for the construction of a no-discharge wastewater treatment system. It also included piping modifications to separate process water from storm water.

On October 12, 1990, a Consent Order between R. Lavin and Sons (a division of North Chicago Refiners and Smelters) and the State of Illinois (IEPA and Attorney General's office) was approved. The requirements of the consent order included additional monitoring and studies (including biomontoring and a Boron study), the building of storm water retention and interim and NPDES Permit final limits. The order required final compliance by June 4, 1992.

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In addressing the question of mass loadings to the creek, the study are an impractical basis for regulating R. Lavin & Sons 'storm water e mass of contaminants is related most directly to the number, length vents, R. Lavin & Sons could not feasibly control its' discharges on a

a proposed NPDES Permit went to 30 day public notice. The s information provided in the 1995 NPDES permit application and the udy. Guidance also included information published in the November r entitled, "Questions and Answers regarding Implementation of an ater Quality Effluent Limitations for Storm Water Permits".

ments and Permit Review:

ction, this facility was technically operating under an NPDES permit 986 (effective February 22, 1986) with an expiration date of e original permit included only the 001 outfall (overflow from reservoir) a storm sewer. In 1987, the permit was modified to include Outfall

Outfall 001 is described as an internal process water overflow, while as stormwater and possible emergency overflow from Outfall 001. tfalls 003 &004 were added to the permit. Flow monitoring and daily d for all four outfalls. Composite samples will be required for total cadmium, copper, lead, nickel, zinc and boron. Grab samples will be & grease. The following conditions should be noted:

uent limits for Outfalls 002, 003 and 004. Effluent limits (pertaining to art A) were given for Outfall 001. However, such limits only apply simultaneously discharging.

isallows the discharge of any process water unless the rainfall in 40 CFR 421.63 are met. To insure compliance with these dition 12 was added. The condition prohibits the use of the storm for the storing of process water, requires that the ditch be pumped as uires that records of any dredging of the ditches be kept and be reports. Compliance with this condition would limit incidences when ows which would go unmonitored.

4,9 and 10 refer specifically to sampling requirements for all the st be sampled at 1000 gallon intervals with a minimum of four grab

samples. The storm water outfalls must analyze the first reportable discharge of each calender month that occurs after a dry period of at least 96 hours. A reportable discharge for Outfall 002 would be greater than 15,000 gallons (at least a three-sample aliquot of 5,000 gallons each). For Outfalls 003 and 004, discharges of four hours or longer capable of producing at least three-sample aliquots would be representative. The grab samples must be taken in the first hour or less.

- Special Condition 11 requires the development of a storm water pollution prevention plan. The permit requires that such a plan be complete within 90 days from the effective date of the permit. The Agency is given a 60-day review period. Upon written plan approval, compliance with the plan shall be made within 120 days. If applicable, the permittee will have the option of making a written certification that changes have been made or to appeal the permit to the Illinois Pollution Control Board. In addition to these requirements, the permittee will be required to submit annual self inspection reports, the first of which is due 14 months after the date of coverage.

NPDES AND CONSENT DECREE COMPLIANCE

Facility Site Review:

At the time of the site visit, both the storage tank and closed loop treatment system was in operation. One of the storage tanks in the treatment system was out of service for cleaning and rehabilitation. The contents of the reservoir appeared clean and well below overflow level. Chemical addition includes flocculate and coagulants supplied by a company named Power Group. Sludge producing efficiency appears adequate. All sludge is reportedly disposed of in the incinerator on site. The contents of the reservoir appeared clean and of low turbidity.

During the inspection, Mr. Lennon stated that Lavin, " completed its closure". By this he meant that all areas to be paved are paved. Both the slag area and railroad areas were paved. Not paved however, is the 002 ditch. According to Mr. Caldwell and Mr. Lennon the ditch is never completely dry and leaching in of groundwater has been observed. At the time of the inspection, the ditch was very high; just inches below the overflow. The contents were frozen. According to Mr. Lennon, the recirculation pumps were frozen. No personnel on site could explain why the level in the ditch was so high. The area just south of the ditch is tributary to Outfall 003. There are some minor slag piles in this area. The area where the big production piles are located is paved. The slag piles, which are mostly uncovered, were in close proximity to catch basins tributary to the outfall 002 ditch.

Permit Verification

Past observations made by this writer, BOL staff and even Lavin employees, have indicated that the west ditch is almost never dry and is constantly receiving some groundwater infiltration, even in dry weather. Well sampling data has indicated groundwater contamination. Part of this problem may be historical. It is believed that the high water table in conjunction with the contamination is a result of historical management practices. These include evidence of a wetland being filled with slag.

During the discussions, RCRA objectives were reviewed. The main plan was to completely pave over the facility. The only items that would not be paved are the catch basins to collect storm water runoff and the two connecting ditches which are up to 8 feet deep in certain areas. Past monitoring by the Bureau of Land has been performed in shallow wells that are six to eight feet in depth. The results have shown heavy contamination to the extent that it has exhibited hazardous waste characteristics and has been termed leachate by DLPC. Maximum concentrations detected included a lead of 20.1 mg/l, a copper of 38.9 mg/l and a zinc of 138 mg/l. It was for this reason that dewatering of the groundwater under the area to be paved was required by the RCRA closure plan. It later confirmed that no dewatering was ever performed as required. Additionally, there have been no studies on the hydrology of the subsurface; that is whether or not the groundwater can be recharged if in fact it is dewatered.

In the section covering contributing flows, the NPDES permit application states that except in cases of when Outfall 001 is discharging into the 002 ditch, " any discharge from Outfall 002 is composed strictly of stormwater to which BMP standards should apply". There is no mention of contaminated ground water in the Outfall 002 description. This item is clearly evident. Such waste streams cannot be addressed by Best Management Practices since they can't be alleviated by a Storm Water Pollution Prevention Plan. Additionally, the source of contamination is likely to be caused more by historical industrial activity than by ongoing production. If contaminated groundwater cannot be considered stormwater associated with industrial activity, then Lavin & Sons may be in automatic non compliance with the NPDES Permit as written in the public notice, as soon as an overflow from outfall 002 occurs.

Self Monitoring Program Evaluation

The permittee has continued to have a difficult but adequate self monitoring program. Both the NPDES Permit and consent order requires extensive sampling, monitoring and laboratory work. Proper chain of custody procedures are maintained when sampling is performed either by security or lab staff. Records on site indicate that Lavin has kept sampling and analysis data in accordance with NPDES standard conditions. Flow records, lab calibration and other QA records also appear to be in order.

A review of Agency records shows that discharge monitoring reports are submitted in a timely manner. Under the direction of Everett Biegalski, the laboratory procedures comply with NPDES standard conditions and 40 CFR 136.6. All lab equipment, including the ICAP, was in good condition. Bench sheets corresponded with submitted data. There is an established QA program. Analysis of known standards is supplied by outside contractors, while duplicate samples are performed 75% of the time. Standards are run on one in eight samples.

The flow meters appear in good condition. For 001 and 002 flow measurements, Lavin uses Unisonic devices with Inventron recorders. Flow is totalized by meter readings. Strip chart recordings are kept. There appears to be no problem with recording any range of flow whether it is high or low. One deficiency noted was calibration has not been performed on a routine basis. Five days after the inspection, the meters were calibrated by Lee Engineering Sales, Inc. On the proposed NPDES permit, flows for 003 and 004 are to be estimated.

One of the main problems is the sampling procedures. The intermittent nature of the discharges make it fairly difficult. The consent order states, ""The defendant shall . . . measure concentrations of effluent by flow proportioned composite samples and report same on DMRs and monthly thereafter." This apparently has been a problem. A letter dated October 31, 1990, was addressed to Todd Rowe of Division of Land Pollution Control from Robert J. Denny from Jenner and Block. In it he explains that the flow meters (which are manufactured in combination with the composite samplers) are calibrated to take a sample of the discharge once every 5,000 gallons. The problem is that the actual sample containers apparently are not big enough. This oversight has made Lavin technically in violation of the consent order. It should be noted however, that the order gives some flexibility. It states "any future NPDES permit shall supersede these requirements to the extent it is inconsistent with these requirements." As noted, the draft permit monitoring conditions have been tailored to equipment on hand.

One major problem with the equipment on hand is that significant discharges can occur and go unmonitored making it near impossible to verify compliance with 40 CFR 421.36 and to calculate any type of loading evaluation. In a November 22, 1996 letter, Mr. Caldwell wrote, "During the dry weather period from November 9 to November 16, an estimated 50,000 gallons was discharged from 002. The flow totalizer in the trailer did not indicate any discharge had occurred. Thus, no samples were drawn, but later examination of the continuous flow records revealed that the overflow had been occurring at an average rate of 5 g.p.m. during this time. In order for this to occur, groundwater and /or process water had to be flowing into the ditches at this rate."

Operation and Maintenance:

Compliance with the standard O&M requirements of the NPDES Permit depends on two items. One would be the implementation of a successful storm water pollution prevention program. The other would be the close monitoring of process water and operation of the storage and treatment units. At this time both have been shown to have deficiencies.

Several improvements have been made in the foundry operation to minimize contamination of storm water. Thirteen baghouses have been installed to reduce air pollution emissions. In addition, control measures such as placing particulate traps in storm drains and periodic sweeping of the paved area has been carried out. However, in terms of pollution prevention, this facility needs significant improvement. There are still slag piles that come into contact with rainwater that can runoff into the storm sewer, probably in higher concentrations due to the paved area. According to staff, several measures are planned to address this problem. These include a totally enclosed slag dump area, a shake out pit and slag bin.

The management of storm / ground or waste water has been shown to be inadequate, as exemplified by the month of November. As noted in the site review, the 002 ditches were full and frozen because they were not pumped immediately after the rain and the pumps themselves had frozen. Additionally, it has been noted up to this periodic and despite the frozen conditions some 50,000 gallons had discharged unmonitored. Two days after the inspection, rainfall occurred, which resulted in a discharge which lasted into even the dry weather. Investigation of the discharge, leads to the discovery of a leak of process water into the plants storm sewer system. It was later estimated that 130,000 gallons of process water was discharged to the ditch in a period from November 4 to November 18. This was during a time when the ditch was not pumped because it was frozen and was discharging unmonitored.

The discharge of wastewater to the Waters of the State is a violation of the NPDES permit (both the expired and the proposed), the consent order and Title 35, Subpart A, Section 309.101 specifically because it violates 40 CFR 421.63. Additionally, Section 306.102 states that all treatment works and associated facilities shall be operated and maintained as to minimize violations of applicable standards during such contingencies as flooding, weather, power failure, equipment failure or maintenance, through such measures as multiple units, holding tanks, duplicate power sources or such other measures as may be appropriate." Additionally the regulation states, "All reasonable actions . . . shall be taken to prevent any spillage of contaminants from causing water pollution". Some ways to prevent such items from occurring in the future would be alarm systems for both overflows and areas prone to leakage of wastewater, standby generators and pumping availability. Any Storm water Pollution Prevention Plan should include an extensive self inspection program to safeguard any such occurrences from happening in the future.

Effluent:

A review of 1996 discharge monitoring reports show that Lavin & Sons are in continued non compliance with the final limits in the consent order for zinc, lead and copper in outfall 002. The issuing of the NPDES permit and modification of the consent decree would result in no effluent limits for Outfall 002 and one less compliance issue.

In reviewing the data the following items should be noted:

- The 002 effluent data for 1996 indicates that despite initiatives such as paving the plant, there has been no improvement in the effluent quality. In comparing the data with 1995, it has actually worsened, while the flows (an average of 0.013 MGD for 1995 and 0.012 for 1996) have remained essentially the same:

parameters in MGD	1995		1996	
	Avg.	Max.	Avg.	Max.
Copper	0.60	1.21	0.83	1.0
Lead	0.42	0.84	0.51	I.05
Iron	0.65	1.68	1.47	7.84
Nickel	0.03	0.07	0.04	0.10
Zinc	3.35	6.78	3.76	7.99
Boron	2.6	6.05	3.53	11.0

In addition to these parameters, the incidence of high pH has worsened The average maximum pH reported was 9.46, with a yearly maximum of 9.99 reported in June. Out of the nine months that a discharge was reported, seven had a pH in excess of the maximum limits of 9.0. In five of the months, the minimum pH reported exceeded 9.0. The high pH can directly be related to ongoing production, since caustics are used.

- The boron problem was noted in the consent order. Instead of a treatment requirement, the order required that a boron study be submitted to the Agency, to coincide with boron monitoring. To address the problem, Lavin used the boron as a fluxing agent, but replaced it with a compound derivative from colemite, which is hydrated calcium borate. However, it has been noted that boron concentrations have been increasing steadily in the past few years.

- Past Agency biomonitoring testing has shown high toxicity in the 002 effluent. As a result, the order required Lavin to submit a biomontioring study. Subsequent testing showed that the LC50 for the 002 effluent was 4.35 % using ceriodaphnia organisms

- In the consent order, it is stated "effluent . . . shall comply with all applicable effluent limits of 35 Ill. Adm. Code part 304 and shall not violate Section 12 of the Act in the waters of the State, including downstream of the site and upstream of Great Lakes Naval Training Center." The water and sediment quality problems in the Pettibone creek have been well documented by the Agency and the Navy. The most dramatic evidence that the first flush study may be in error, is the sediment data collected during the CERCLA Expanded Site Inspection. No other source of contamination of Pettibone Creek was as apparent. The upstream concentration of copper was 106 mg/kg, while the downstream concentration was 2530 mg/kg. The upstream concentration of lead was 46.8 mg/kg, while the downstream concentration was 1840 mg/kg. The most dramatic increase was for zinc. The upstream was 614 mg/kg while the downstream concentration was 17000 mg/kg. There were also significant increases in barium, iron, beryllium, manganese, chromium and nickel.
The inspection compared Pettibone Creek sediment sample results to the Guidelines for the Protection and Management of Sediment Quality in Ontario. The concentrations found were greater than the "Severe Effect Level, " for copper, lead, manganese, mercury, lead, and zinc. Title 35, Subpart b, Section 302. 203 states, " waters of the State shall be free from sludge or bottom deposits . . . of other than a natural origin. The allowed mixing zone provisions shall not be used to comply with the provisions of this section".

SUMMARY

This facility has not been able to meet final technology-based effluent limits as mandated by the consent order. The reissued NPDES permit may grant compliance relief since effluent limits will no longer apply to outfalls to Pettibone Creek. The permit conditions are based on information provided in the permit application, a first flush study provided by Lavin and USEPA guidance concerning storm water associated with industrial activity. The following inspection findings should be noted:

- Lavin's first flush study "suggests" that the "storm water runoff" from this facility has had no effect on water quality in the creek. However, Agency data confirms that Lavin is a major contributor to the contaminated sediment in the creek. The concentration of contaminated sediment may be considered a violation of water quality standards (Section 302. 203).

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- So far any attempts at Pollution Prevention have not been successful based on discharge monitoring report data. Lavin officials claim that the plan is to install more equipment to minimize slag piles coming into contact with storm water. The first flush study has suggested that best management practices have already been achieved. It states that the collected data on Outfall 004,"suggests that the benefits of Best Management Practices for storm water control likely have already been achieved. Additional measures would result in very little improvement in runoff quality and probably be cost ineffective. There were also less significant improvements in Outfalls 002 and 003."

Chris Kallis, EPS

CK:ck

Attachments
- DMR Summary
- CERCLA Sediment Data
- Well Monitoring Data
- Site Map
- Propsed NPDES Permit Effluent Requirements

FACILITY NAME: NCRS -002 LOCATION: North Chicago NPDES # 0002755

SAMPLING PERIOD FROM: Jan 96 TO: Dec 96 COUNTY: Lake

OUTFALL

FROM DMR's

MONTH	Flow Avg	Flow Max	pH min	pH max	copper Avg	copper max	lead Avg	lead max	iron Avg	iron max	nickel Avg	nickel max	zinc Avg	zinc max	Boron Avg	Boron max
Jan 96	.0139	.1500	9.18	9.18	1.20	1.20	0.62	0.62	1.99	1.99	0.03	0.03	4.37	4.37	2.72	2.72
Feb	.00069	.0020	9.41	9.41	0.82	0.82	0.56	0.56	1.03	1.03	0.07	0.07	3.59	3.59	3.10	3.10
March	.00065	.01800	8.86	8.86	0.84	0.84	0.59	0.59	0.89	0.89	0.05	0.05	4.13	4.13	3.80	3.80
April	0	0														
MAY	.02047	.31700	9.05	9.55	1.34	1.66	0.80	0.93	1.88	2.36	0.08	0.10	4.22	5.28	1.58	2.52
June	.0315	.2540	9.46	9.99	1.30	2.32	0.66	1.05	4.03	7.84	0.05	0.10	3.38	5.22	2.96	3.59
July	.0184	.4970	9.38	9.74	0.75	0.77	0.36	0.38	1.70	1.88	0.01	0.01	3.39	3.52	3.05	3.44
August	.0106	.1910	8.67	9.77	0.57	0.67	0.39	0.46	0.69	0.89	.02	.02	5.69	7.99	1.82	2.00
September	.0058	.173	7.5	9.84	0.51	0.56	0.41	0.51	.76	.98	.04	.05	3.54	4.87	1.80	3.87
October	0	0														
November	.0025	.0180	8.83	8.83	0.17	0.17	0.24	0.24	0.26	0.26	0.03	0.03	1.57	1.57	11.0	11.0
December	0	0														
Average	.012	.18	8.81	9.46	.83	1.0	.51	.60	1.47	2.01	.042	.051	3.76	4.18	3.53	4.0

FACILITY NAME: NCRS - 002 LOCATION: North Chicago IL0022755

SAMPLING PERIOD FROM: Jan 96 TO: Dec 96 COUNTY: Lake

OUTFALL

FROM DMR's cadmium

MONTH	Avg	max
Jan 96	.02	.02
Feb	.02	.02
March	.02	.02
April	0	0
May	.02	.02
June	.01	.03
July	.01	.01
August	.03	.04
September	.02	.02
October	0	0
November	.01	.01
December	—	—
Average	.02	.02

NORTH CHICAGO REFINERS & SMELTERS

ILD097271563

SOIL SAMPLES

CK

SAMPLING POINT	X101 GLNTC 4-27-94	X102 GLNTC 4-27-94	X103 School 4-27-94	X104 Resid 4-27-94	X105 Resid. 4-27-94	X106 Resid 4-27-94	X107 Resid 4-27-94	X108 Resid. 4-27-94	X109 Resid. 4-27-94	X110 Resid. 4-27-94	X111 Resid 4-27-94
VOLATILES	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Methylene Chloride	4 00 J	12 00 U	--	--	--	--	7 00 J	--	--	--	--
1 1 1 Trichloroethane	3 00 J	12 00 U	--	--	--	--	6 00 J	--	--	--	4 00 J
SEMIVOLATILES	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
2 Methylnaphthalene	390 00 U	390 00 U	--	--	110 00 J	--	--	--	--	--	--
Acenaphthylene	390 00 U	390 00 U	--	--	170 00 J	170 00 J	--	--	--	--	--
2,6 Dinitrotoluene	390 00 U	390 00 U	--	--	--	--	--	--	--	--	--
Phenanthrene	420 00	250 00 J	--	--	--	480 00	510 00	170 00 J	190 00 J	890 00	190 00 J
Anthracene	390 00 U	390 00 U	89 00 J	--	90 00 J	--	--	--	--	150 00 J	--
Carbazole	390 00 U	390 00 U	89 00 J	--	--	--	--	--	--	94 00 J	--
Di-n-Butylphthalate	1100 00	390 00 U	--	400 00	--	830 00	1200 00 B	1500 00	--	830 00	1100 00
Fluoranthene	590 00	610 00	390 00	130 00 J	250 00 J	760 00	630 00	310 00 J	300 00 J	1300 00	380 00 J
Pyrene	520 00	490 00	250 00 J	130 00 J	350 00 J	940 00	710 00	240 00 J	260 00 J	1600 00	340 00 J
Butylbenzylphthalate	390 00 U	390 00 U	--	--	--	--	--	--	--	130 00 J	--
3 3-Dichlorobenzidine	390 00 U	390 00 U	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	400 00	430 00	--	--	--	640 00	480 00	140 00 J	190 00 J	1100 00	220 00 J
Chrysene	470 00	480 00	850 00	500 00	1100 00	810 00	540 00	190 00 J	240 00 J	1200 00	270 00 J
bis(2 Ethylhexyl)phthalate	150 00 J	390 00 U	--	--	--	530 00	570 00	590 00	610 00	--	280 00 J
Di n Octylphthalate	390 00 U	390 00 U	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	460 00	390 00 U	--	--	--	--	520 00	--	--	1100 00	230 00 J
Benzo(k)fluoranthene	370 00 J	490 00	820 00	450 00	790 00	800 00	440 00	170 00 J	210 00 J	--	200 00 J
Benzo(a)pyrene	380 00 J	320 00 J	570 00	310 00 J	670 00	620 00	--	--	--	800 00	180 00 J
Indeno(1 2 3 cd)pyrene	200 00 J	390 00 U	--	--	--	--	--	--	--	--	--

NORTH CHICAGO REFINERS & SMELTERS

ILD097271563

SOIL SAMPLES (continued)

SAMPLING POINT	X101 GLNTC 4-27-94	X102 GLNTC 4-27-94	X103 School 4-27-94	X104 Resid 4-27-94	X105 Resid 4-27-94	X106 Resid. 4-27-94	X107 Resid 4-27-94	X108 Resid. 4-27-94	X109 Resid. 4-27-94	X110 Resid. 4-27-94	X111 Resid. 4-27-94
PESTICIDES	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
delta BHC	20 00 U	2 00 U	--	--	--	3 90 P	--	280 00 PD	280 00 PD	--	--
gamma - BHC (Lindane)	20 00 U	2 00 U	--	0 79 JP	0 29 JP	1 40 JP	--	--	--	--	--
Heptachlor	20 00 U	2 00 U	--	--	--	--	--	150 00	150 00	3 30 P	--
Heptachlor epoxide	20 00 U	2 00 U	2 10 P	7 20 P	--	--	--	1000 00 PD	1000 00 PD	5 90 P	--
Dieldrin	20 00 U	0 76 JP	1 90 JP	5 40 P	--	25 00 P	2 90 JP	--	--	--	43 00 PD
4,4 - DDE	2600 00 BD	35 00	--	500 00 D	80 00	65 00 D	31 00	150 00	150 00	32 00	--
Endrin	4 10 JP	4 80 P	10 00 P	22 00 P	28 00 P	88 00 D	39 00	--	--	30 00	180 00 D
Endosulfan II	38 00 U	2 60 J	--	--	11 00 P	--	11 00	--	--	--	--
4,4 - DDD	28 00 JP	4 80 P	1 90 JP	54 00 D	11 00 P	41 00 PD	6 20 P	--	--	7 40 P	7 60 P
Endosulfan sulfate	38 00 U	3 90 U	--	--	--	--	--	20 00 JP	14 00 JP	--	--
4,4 - DDT	590 00 BD	22 00	22 00	430 00 D	89 00	120 00 PD	38 00 P	130 00 P	140 00 P	41 00 P	18 00 P
Methoxychlor (Marlate)	58 00 J	20 00 U	--	--	--	--	--	--	--	--	14 00 JP
Endrin Ketone	38 00 U	3 90 U	--	--	--	--	--	--	--	--	--
Endrin aldehyde	8 70 JP	3 90 U	--	--	--	--	7 70 P	14 00 JP	13 00 JP	--	--
alpha - Chlordane	4 40 JP	0 44 JP	8 60	23 00 P	8 00 P	55 00 D	4 60 P	4100 00 D	4100 00 D	40 00 P	50 00 D
gamma - Chlordane	20 00 U	1 50 JP	4 80 P	9 70 P	6 50 P	20 00 P	4 80 P	2000 00 PD	1900 00 PD	--	48 00 PD
Toxaphene	2000 00 U	200 00 U	--	--	--	--	--	--	--	--	--
Aroclor - 1016	380 00 U	39 00 U	--	--	--	650 00 D	--	--	--	--	--
Aroclor - 1254	--	--	--	--	--	--	--	--	--	--	2100 00 D
Aroclor - 1260	380 00 U	39 00 U	91 00	200 00 P	220 00	640 00 D	260 00	320 00 JP	370 00 JP	230 00	1300 00 D
INORGANICS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Aluminum	15400 00	13700 00	14900 00	12700 00	16700 00	15500 00	14700 00	16000 00	16800 00	13300 00	16000 00
Antimony	10 20 UJ	10 10 UJ	--	--	--	--	--	--	--	--	--
Arsenic	7 60	9 10	6 20	12 60	11 10	10 60	13 10	10 00	11 40	12 10 J	9 10 J
Barium	72 20	63 00	91 90	136 00	116 00	135 00	129 00	151 00	159 00	103 00	101 00
Beryllium	0 81 B	0 75 B	0 84 B	1 10	1 50	1 00 B	1 10	1 00 B	1 00 B	0 97 B	1 00 B
Cadmium	0 80 U	0 79 U	--	5 50	5 30	3 00	5 70	4 60	3 40	2 61	1 40
Calcium	16100 00	26200 00	18300 00	16300 00	25500 00	11000 00	12100 00	12300 00	12500 00	18100 00	12400 00
Chromium	23 40	21 60	23 00	36 10	34 70	216 00	75 80	45 90	45 00	62 40	33 30
Cobalt	8 10 B	9 00 B	7 20 B	7 40 B	9 50 B	10 60	8 50 B	9 80 B	10 40 B	12 70	9 00 B
Copper	24 40	22 70	60 20	506 00	606 00	200 00	370 00	300 00	287 00	281 00	271 00
Iron	22900 00	21700 00	20100 00	23300 00	25500 00	24400 00	22100 00	21700 00	22800 00	22300 00	22600 00
Lead	47 70	38 70	132 00	1180 00	586 00	297 00	467 00	251 00	233 00	318 00	200 00
Magnesium	10600 00	17500 00	10800 00	8900 00	11400 00	2740 00	6610 00	7240 00	7400 00	10400 00	7070 00
Manganese	700 00	689 00	539 00	404 00	542 00	470 00	553 00	782 00	814 00	709 00	412 00
Mercury	0 05 B	0 06 B	0 15	0 43	0 47	0 58	3 80	0 23	0 26	0 43	0 13
Nickel	23 80	26 70	22 60	34 80	44 60	32 20	30 70	27 70	24 30	31 70	28 80
Potassium	3250 00	2670 00	2630 00	1940 00	2280 00	2680 00	2080 00	2230 00	2150 00	2110 00	2600 00
Selenium	0 23 UJ	0 24 UJ	0 29 BJ	1 50 J	1 60 J	0 50 BJ	2 10 J	0 43 BJ	2 00 J	2 30 J	0 34 BJ
Silver	0 80 U	0 79 U	--	1 00 B	--	2 40	9 80	1 10 B	1 20 B	--	--
Sodium	89 40 B	115 00 B	119 00 B	121 00 B	252 00 B	114 00 B	120 00 B	98 80 B	108 00 B	110 00 B	87 40 B
Thallium	0 23 UJ	0 24 UJ	--	--	--	--	--	--	0 52 B	0 44 B	0 45 B
Vanadium	37 00	32 00	35 10	33 60	35 30	35 40	35 60	36 70	38 70	31 90	36 80
Zinc	91 80	86 30	329 00	2650 00	2690 00	761 00	1740 00	1210 00	1150 00	1100 00	845 00
Cyanide	0 98 U	0 98 U	--	--	1 40	2 10	--	1 40	--	--	--

NORTH CHICAGO REFINERS & SMELTERS
ILD097271563

SEDIMENT SAMPLES

SAMPLING POINT	X201 Trib to Pettibone	X202 Trib to Pettibone	X203 L Michigan Harbor	X204 Pettibone GLNTC	X205 Dup. of X204	X206 Pettibone GLNTC	X207 Pettibone GLNTC	X208 Pettibone	X209 Pettibone	X210 Origin of Pettibone
Date	4-26-94	4-26-94	4-26-94	4-26-94	4-26-94	4-26-94	4-26-94	4-26-94	4-26-94	4-26-94
VOLATILES	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Vinyl Chloride	14 0 U	14 0 U	--	--	--	--	--	--	30 0	670 0 D
Methylene Chloride	14 00 U	14 0 U	35 0 B	--	--	--	--	--	--	--
Acetone	23 0	12 0 J	26 0	16 0	24 0 J	7 0 J	46 0 J	5 0 J	5 0 J	--
Carbon Disulfide	4 0 J	14 0 U			4 0 J	4 0 J	4 0 J	--	--	--
1 1 Dichloroethene	--	--	--	--	--	--	--	--	--	8 0 J
1 1 Dichloroethane	--	--	--	--	--	--	--	--	--	12 0 J
1 2-Dichloroethene (total)	14 0 U	14 0 U				--	34 0	25 0	25 0	700 0 D
2 Butanone	13 0 J	5 0 J	20 0	7 0 J	6 0 J	--	31 0 J	--	--	--
1 1 1-Trichloroethane	14 00 U	14 0 U	13 0	--	--	--	--	--	--	--
Trichloroethene	14 00 U	14 0 U	--	--	--	--	13 0 J	8 0 J	--	4 0 J
4 Methyl-2-Pentanone	14 00 U	14 0 U	--	--	--	--	3 0 J	--	--	--
Tetrachloroethene	14 00 U	14 0 U	-	--	--	--	21 0	--	--	--
1 1 2 2 Tetrachloroethane	14 00 U	14 0 U	--	--	--	--	4 0 J	--	--	--
Toluene	14 00 U	14 0 U	4 0 J	--	--	--	12 0 J	--	--	--
Ethylbenzene	14 00 U	14 0 U	-	--	--	--	6 0 J	--	--	--
Styrene	14 00 U	14 0 U	--	--	--	--	3 0 J	--	--	--
Xylene (total)	14 00 U	14 0 U	6 0 J	--	--	--	33 0	--	--	--
SEMIVOLATILES	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
4 Methylphenol	450 00 U	440 0 U	--	--	--	--	820 0 J	--	--	--
Naphthalene	130 00 J	170 0 J	600 0	--	--	300 0 J	--	--	--	--
2-Methylnaphthalene	110 00 J	160 0 J	310 0 J	--	--	120 0 J	--	--	93 0 J	--
Acenaphthylene	450 00 U	120 0 J	--	--	--	--	--	--	--	--
Acenaphthene	730 00	440 0 U	850 0	--	--	530 0	--	--	--	--
Dibenzofuran	510 00	130 0 J	600 0	--	--	330 0 J	--	--	--	--
Fluorene	680 00	220 0 J	980 0	--	--	--	--	--	--	--
Phenanthrene	45000 00 U	1100 0	5700 0	3100 0	3100 0	4800 0	5000 0	--	130 0 J	420 0
Anthracene	840 00	220 0 J	1200 0	--	--	670 0	--	--	--	--
Carbazole	950 00	220 0 J	1500 0	--	--	1200 0	--	--	--	--
Di n-Butylphthalate	740 00	960 0	980 0 B	1100 0 J	1300 0 J	--	1100 0 J	--	--	--
Fluoranthene	3100 00	1600 0	2000 0	3000 0	3100 0	7200 0	6700 0	--	--	750 0
Pyrene	45000 00 U	1400 0	1100 0	2400 0	2800 0	6100 0	4600 0	--	--	730 0
Butylbenzylphthalate	420 00 J	440 0 U	--	--	--	--	--	--	--	--
Benzo(a)anthracene	2200 00	880 0	--	1700 0 J	--	3400 0	2700 0	--	--	410 0
Chrysene	2300 00	870 0	3800 0	--	--	3500 0 J	3300 0	--	--	490 0
bis(2 Ethylhexyl)phthalate	300000 00	560 0	--	--	--	12000 0	22000 0	--	--	440 0
Di n Octylphthalate	23000 00 J	440 0 U	-	--	--	--	--	--	--	--
Benzo(b)fluoranthene	450 00 U	730 0	--	--	--	--	4300 0	--	--	--
Benzo(k)fluoranthene	2300 00	440 0 U	3500 0	--	--	--	2800 0	--	--	--
Benzo(a)pyrene	450 00 U	440 0 U	2500 0	--	--	2100 0	3200 0	--	--	--

NORTH CHICAGO REFINERS & SMELTERS
ILD097271563

SEDIMENT SAMPLES (cont)

SAMPLING POINT	X201 Trib. to Pettibone	X202 Trib. to Pettibone	X203 L. Michigan Harbor	X204 Pettibone GLNTC	X205 Dup. of X204	X206 Pettibone GLNTC	X207 Pettibone GLNTC	X208 Pettibone	X209 Pettibone	X210 Origin of Pettibone
Date	4-26-94	4-26-94	4-26-94	4-26-94	4-26-94	4-26-94	4-26-94	4-26-94	4-26-94	4-26-94
PESTICIDES	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
alpha BHC	2 30 U	1 2 J	5 5 P	--	--	6 0 P	--	--	--	--
delta BHC	2 30 U	2 3 U	--	120 0 P	--	--	--	--	--	--
Heptachlor	1 30 J	2 3 U	--	--	--	--	--	--	--	--
Heptachlor epoxide	2 30 U	4 0 P	--	--	--	--	--	--	--	--
Endosulfan I	2 30 U	2 3 U	--	--	30 0	--	--	--	--	--
Dieldrin	4 80 P	9 8 P	12 0 P	36 0 JP	25 0 JP	64 0 PD	5 8 P	--	--	0 6 JP
4 4 - DDE	4 50 U	41 0	280 0 D	230 0 P	260 0 P	300 0 D	--	--	--	--
Endrin	33 00 P	9 7 P	82 0 PD	210 0 P	210 0 P	220 0 PD	53 0 P	0 4 JP	0 7 JP	6 0 P
Endosulfan II	12 00	4 4 U	--	--	--	--	17 0	--	--	--
4 4' - DDD	26 00 P	59 0	580 0 D	3300 0 D	3100 0 D	460 0 PD	53 0 P	--	--	5 7 P
4 4 - DDT	42 00	71 0	200 0 D	170 0	310 0	170 0 PD	69 0 P	0 5 JP	0 7 JP	--
Endrin aldehyde	4 50 U	4 4 U	--	96 0 P	--	--	--	0 2 JP	--	6 1 P
alpha - Chlordane	1 10 JP	29 0	19 0	84 0	--	16 0	12 0 P	--	--	2 4
gamma - Chlordane	2 30 U	16 0 P	21 0 P	36 0 P	30 0 P	--	8 5 P	--	--	1 7 JP
Aroclor - 1016	45 00 U	44 0 U	--	1300 0	1600 0	680 0 P	--	--	12 0 J	--
Aroclor - 1254	270 00	44 0 U	1200 0 PD	5200 0 PD	3300 0 P	1800 0 D	650 0	--	--	69 0
Aroclor - 1260	310 00	160 0	--	1400 0	1700 0	2800 0 D	460 0	10 0 J	11 0 JP	--
INORGANICS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Aluminum	4320 00	3740 0	4180 0	11600 0	12400 0	4830 0	4450 0	12800 0	16000 0	10100 0
Antimony	14 70 UJ	10 8 UJ	--	15 5 J	--	--	--	--	--	--
Arsenic	5 90 J	6 1 J	8 8 J	22 1	24 0	7 4	7 4 J	17 5 J	7 1 J	8 5 J
Barium	54 90 B	55 2	31 6 B	208 0	167 0	48 8	50 4 B	104 0	68 6	96 1
Beryllium	0 46 B	0 3 B	0 8 B	2 4	3 0	0 6 B	0 7 B	1 1 2	1 3	0 9 B
Cadmium	1 20 U	0 8 U	0 9 B	4 7	5 6	0 9 B	2 3	1 5	--	--
Calcium	47800 00	65000 0	39700 0	88700 0	102000 0	53700 0	31800 0	85700 0	76000 0	83800 0
Chromium	9 70	13 0	12 3	61 6	69 2	21 6	20 8	42 2	25 3	17 0
Cobalt	7 10 B	6 9 B	6 0 B	18 1	15 4	5 0 B	4 1 B	13 5	11 5	8 1 B
Copper	38 20	16 9	15 9 0	465 0	475 0	209 0	425 0	2530 0	106 0	69 8
Iron	11600 00	16000 0	12000 0	19000 0	17300 0	15000 0	12100 0	36700 0	23700 0	19300 0
Lead	146 00	48 0	149 0	392 0	435 0	278 0	167 0	1840 0	46 9	48 2
Magnesium	23700 00	36400 0	20500 0	24600 0	29800 0	28700 0	15700 0	38500 0	39500 0	44300 0
Manganese	345 00	472 0	342 0	2140 0	2470 0	378 0	291 0	1110 0	541 0	616 0
Mercury	0 04 B	0 1 B	0 2	1 4	1 6	0 3	0 1 B	0 2	1 1	--
Nickel	9 20 B	10 4	24 9	216 0	445 0	22 9	19 4	107 0	36 1	26 1
Potassium	836 00 B	1060 0	885 0 B	3350 0	3290 0	1190 0	636 0 B	1680 0	4700 0	2880 0
Selenium	0 27 UJ	0 2 UJ	--	3 5 J	5 0 J	0 7 BJ	--	2 2 J	--	--
Silver	1 20 U	0 8 U	1 5 B	42 1	50 8	1 8 B	--	--	--	--
Sodium	292 00 B	227 0 B	463 0 B	765 0 B	748 0 B	273 0 B	548 0 B	5540 0	700 0 B	658 0 B
Thallium	0 27 U	0 2 U	--	--	0 4 BJ	--	--	0 2 B	0 5 B	0 3 B
Vanadium	15 00	13 8	14 2	25 6	26 9	15 1	12 5 B	22 4	29 7	21 2
Zinc	159 00	83 3	664 0	1160 0	605 0	685 0	1230 0	17000 0	614 0	820 0
Cyanide	1 20 U	1 0 U		3 9	4 2	2 4	--	--	--	--

TENTATIVELY IDENTIFIED COMPOUNDS

North Chicago Refiners & Smelters
ILD097271563

SOIL SAMPLES						
SAMPLE POINT	X102	X103	X104	X105	X108	X109
Benzenedicarboxylic acid	2000 BJN	2200 JN	1800 JN	2300 JN	N D.	1600 J
Heptachlor Epoxide	N D	N D	N D	N D	490 JN	550 JN
Methyl Phenanthrene	N D	N D	N D	840 JN	N D	N D

SEDIMENT SAMPLES						
SAMPLE POINT	X201	X203	X206	X207	X208	X209
Benzenedicarboxylic acid	290000 JN	N D	N D	N D	1700 JN	2100 JN
Benzo(c)phenanthrene	N D	N D	1400 JN	N D	N D.	N D
Dimethyldisulfide	N D	N D	N D	220 JN	N D	N D
Hydroxymethyl Pentanone	340000 JNBA	N D	170000 JNBA	180000 JNBA	N D.	N D
Methylanthracene	N D	2600 JN	N.D.	N D	N D.	N D.
Naphthacene	N D.	7000 JN	N D.	N D	N D.	N D
Thiobis Methane	N D	N D	N D	230 JN	N D	N D

SEDIMENT SAMPLE DESCRIPTIONS

SAMPLE	DEPTH	APPEARANCE	APPROXIMATE LOCATION
X201	4" – 8" under 2" water	Black/brown; sandy to med. size gravel; leaf decay	GLNTC, northern trib. to Pettibone 138' downstream of steam line
X202	4" – 6" under 4" – 6" water	Black; sandy with leaf decay	GLNTC, southern trib. to Pettibone 274' upstream of hospital bridge
X203	6" – 16" under 2.5' water	Dark silty gravel with some sand	GLNTC, Inner harbor; 160' E of bridge marked "1938" 52' N of southern concrete bank
X204/X205	16" – 18" under 18" water	Very black; sandy, silty with gravel; petroleum–like odor	GLNTC, Pettibone Crk. between harbor and southern trib. 42' S of gravel rd. and 183' W of bridge
X206	4" – 8" under 3" water	Black; sandy to lrg rock texture; tar–like smell	GLNTC, Pettibone Crk. between the tributaries; 140' downstream of bunker 24 E
X207	0" – 6" under 1" water	Dark grey; silt/sand with leaf matter	GLNTC, Pettibone Crk. 12' downstream from culvert where creek enters GLNTC
X208	0" – 6" under 6" water	Grayish brown clay	Pettibone Crk. NW of Sheridan Rd. 15' downstream of outfall from east/north.
X209	8" – 9" under 8" water	Hard gray clay	Pettibone Crk. NW of Sheridan Rd. 34' downstream from Federal Chicago fence.
X210	0" – 6" under 4" water	Dark gray/green; silty sandy clay	Origin of Pettibone Crk. 1' downstream of culvert from north 20' east of Commonwealth

NORTH CHICAGO REFINERS & SMELTERS
ILD097271563

SOIL SAMPLE DESCRIPTIONS

SAMPLE	DEPTH	APPEARANCE	APPROXIMATE LOCATION
X101	0" – 1"	Light brown silt loam	GLNTC, Lawn of housing unit 2845 42' S of south side of housing unit 2845 and 93' W of ???some street
X102	0" – 1"	Light brown silty loam with some gravel and clay, black lumps	GLNTC; Baseball field, lawn area north of Wyoming St. 114' N of Wyoming St and 50' W of utility pole B280
X103	0" – 1"	Light brown silty loam	M P Hart School; 1110 18th Street East of building and south of playground 27' S of playground fence and 30 5' E of east side of school building
X104	0" – 1"	Dark brown silt loam with some sand	1923 Glenn; off SW corner of house; 18' S of southwest corner of house and 25' E of fence along Glenn
X105	0" – 1"	Dark brown humus with some clay	1924 Jackson Street, front lawn, east of house; 23' E of southeast corner of house and 15' S of home's walkway leading to front porch
X106	0" – 1"	Light brown silty loam	1018 Argonne Drive; front lawn; 12' S of southeast corner of home and 14'4" W of walk leading to front door
X107	0" – 1"	Dark brown silt loam with some sand	918 Argonne; front lawn; 16' S of home's southeast corner and 18 5' W of home's walk leading to front door
X108/X109	0" – 1"	Light brown silty loam	917 Argonne; back lawn; 15' W of residence's east wood fence and 19' S of south wall of house
X110	0" – 1"	Light brown silty loam	1830 Park Ave., back lawn; 20' W of west side of house and 11 10" S of hurricane fence

I am in the process of identifying this street name!
⇒ Bldg 3400 off of Buckley Rd

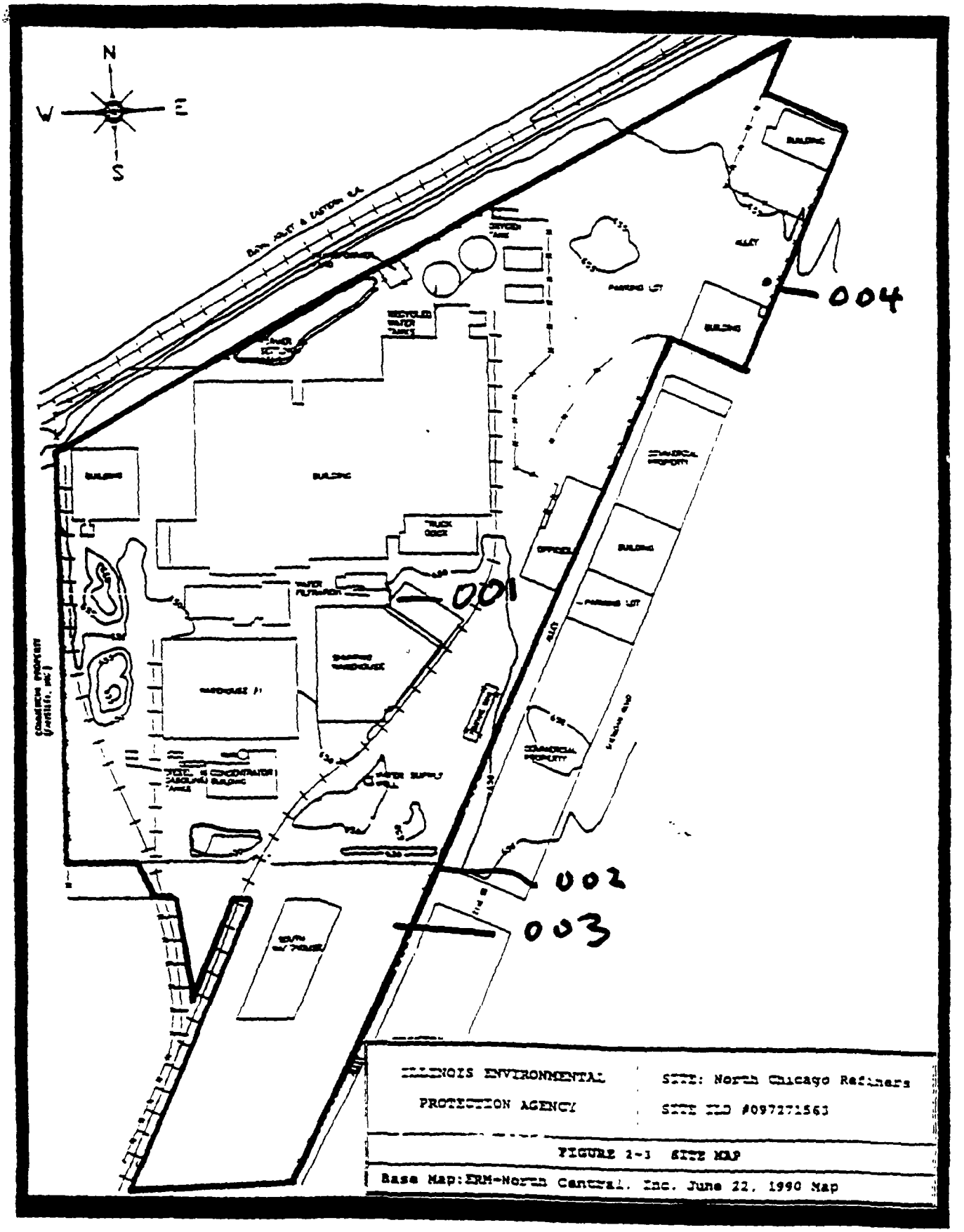
STATE OF ILLINOIS
ENVIRONMENTAL PROTECTION AGENCY

IL 532-0357
ADM 39
054-002

Subject permit limits
Data Lavin + Sons sediment
Reviewed by C Kulle Date 2-15-95

Sediment data from upstream and downstream of NCRS combined discharge from storm sewer. All concentrations in mg/kg

parameter	upstream	downstream
Barium	68.6	104
Beryllium	1.3	11.2
Chromium	25.3	42.2
Copper	106	2530
Iron	23700	36700
Lead	46.9	1840
Manganese	541	1110
Nickel	36.1	107
Zinc	614	17000


N
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004
001
002
003
ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
SITE: North Chicago Refiners
SITE ILD #097271563
FIGURE 1-1 SITE MAP
Base Map: ERM-North Central, Inc. June 22, 1990 Map

DRAFT

DEC 14 1998

PUBLIC NOTICED

NPDES Permit No. IL0002755

Effluent Limitations and Monitoring

PARAMETER	LOAD LIMITS lbs/day 30 DAY AVG.	LOAD LIMITS lbs/day DAILY MAX	CONCENTRATION LIMITS mg/l 30 DAY AVG.	CONCENTRATION LIMITS mg/l DAILY MAX.	SAMPLE FREQUENCY	SAMPLE TYPE
1 From the effective date of this permit until the expiration date of this permit, the effluent of the following discharge(s) shall be monitored and limited at all times as follows:						
Outfall(s): 002, 003 and 004 Stormwater						
Flow					When Discharging	Estimate
pH			Monitor	Monitor	See Special Condition 3	Manual Grab Sample
Total Suspended Solids			Monitor	Monitor	See Special Condition 3	Daily Composite*
Iron (Total)			Monitor	Monitor	See Special Condition 3	Daily Composite*
Cadmium (Total)			Monitor	Monitor	See Special Condition 3	Daily Composite*
Copper (Total)			Monitor	Monitor	See Special Condition 3	Daily Composite*
Lead (Total)			Monitor	Monitor	See Special Condition 3	Daily Composite*
Nickel (Total)			Monitor	Monitor	See Special Condition 3	Daily Composite*
Zinc (Total)			Monitor	Monitor	See Special Condition 3	Daily Composite*
Oil & Grease			Monitor	Monitor	See Special Condition 3	Manual Grab Sample
Boron			Monitor	Monitor	See Special Condition 3	Daily Composite*

See Special Condition No. 11

*See Special Condition No. 10

NPDES Permit No. IL0002755

Effluent Limitations and Monitoring

PARAMETER	LOAD LIMITS lbs/day 30 DAY AVG.	LOAD LIMITS lbs/day DAILY MAX	CONCENTRATION LIMITS mg/l 30 DAY AVG.	CONCENTRATION LIMITS mg/l DAILY MAX.	SAMPLE FREQUENCY	SAMPLE TYPE

1 From the effective date of this permit until the expiration date of this permit, the effluent of the following discharge(s) shall be monitor and limited at all times as follows.

Outfall(s): 001 Process Water Emergency Overflow (These limitations apply at Outfall 001 only when 001 and 002 are simultaneously discharging).

Flow				Daily When Discharging	24 Hour Total
pH	See Special Condition No *			Daily When Discharging	Manual Grab Sample
Total Suspended Solids		15.0	30.0	Daily When Discharging	Daily Composite*
Iron (Total)		2.0	4.0	Daily When Discharging	Daily Composite*
Cadmium (Total)		0.15	0.30	Daily When Discharging	Daily Composite*
Copper (Total)		0.5	1.0	Daily When Discharging	Daily Composite*
Lead (Total)		0.2	0.4	Daily When Discharging	Daily Composite*
Nickel (Total)		1.0	2.0	Daily When Discharging	Daily Composite*
Zinc (Total)		1.0	2.0	Daily When Discharging	Daily Composite*
Oil & Grease		15.0	30.0	Daily When Discharging	Manual Grab Sample
Boron			1.0	Daily When Discharging	Daily Composite*

See Special Condition No. 2

*See Special Condition No. 9

TABLE 7

TOTAL INORGANICS FOR SHALLOW MONITORING WELL WATER SAMPLES
SUMMARY OF VALIDATED ANALYTICAL RESULTS
FOR THE FIRST AND SECOND ROUND SAMPLES (1)
NORTH CHICAGO REFINERS AND SMELTERS
NORTH CHICAGO, ILLINOIS

Sample Designation	NCMW1S1W	NCMW1S2W	NCMW2S1W	NCMW2S2W	NCMW2S2WB	NCMW3S1W
Remarks					Field Blank	
Sampling Round	First	Second	First	Second	Second	First
Sampling Date	11/91	1/92	11/91	1/92	1/92	11/91
Inorganics, ug/L						
Aluminum	12,600. J	NA	19,000.	NA	NA	47,000.
Antimony	37.6 U	8.7 U	19.1 U	23.5 U	9.	105.
Arsenic	13.1 J	5.3	10.1 J	16.2	-	18.4 J
Barium	179 J	166.	175.	151.	-	355.
Beryllium	UL	-	1.2	3. U	1.	14.
Cadmium	61.3 J	6.8 U	12. U	8.1 U	-	18.1
Calcium	156,000. J	NA	179,000.	NA	NA	154,000.
Chromium	1,190 J	199.	75.7	87.8	UL	273.
Cobalt	16.1 U	5.3 U	16.8 U	21.6	-	32.4 U
Copper	5,120. J	675.	355.	560.	6.7	14,200.
Iron	29,700. J	NA	41,500.	NA	NA	69,600.
Lead	1,630. J	250.	709.	863.	2.9 J	5,320. J
Magnesium	105,000. J	NA	88,300.	NA	NA	88,700.
Manganese	1,500. J	NA	1,080.	NA	NA	2,880.
Mercury	UL	-	-	-	-	-
Nickel	364 R	281.	87.7	92.9	-	306.
Potassium	59,900 J	NA	25,100.	NA	NA	31,100.
Selenium	(5x) R	UL	- R	20.4 J	UL	(5x) R
Silver	8.8 J	3.4 U	5.4	-	-	9.1
Sodium	1,460,000. J	NA	73,100.	NA	NA	459,000.
Thallium	(5x) UL	(5x) UL	UL	UL	UL	(5x) U
Vanadium	27.4 J	6.7 U	39.2	47.4	-	76.4
Zinc	11,900. J	2,070.	5,240.	4,910.	12.	28,300.
Boron	34,800. J	33,100. J	3,430. J	7,960. J	- R	16,000. J
Cyanide	-	315.	-	UL	-	-
Tin	NA	66.2 U	NA	112. U	-	N

Key:

- = Element was not detected.

U = This result is qualitatively suspect because this constituent was detected in field, equipment, and/or laboratory blanks at similar levels.

R = Unreliable result; analyte may or may not be present in this sample.

J = Quantitation is approximate as a result of limitations identified during the quality assurance review.

NA = Not analyzed.

UL = This analyte was not detected, but the detection limit is probably higher because of a low bias identified during the quality assurance review.

(#x) = This element was analyzed for and was not detected; however, as a result of sample dilutions, the reported detection limit was multiplied by the factor in parentheses.

Note:

(1) Complete analytical results can be found in the validation reports.

TABLE 7

TOTAL INORGANICS FOR SHALLOW MONITORING WELL WATER SAMPLES
SUMMARY OF VALIDATED ANALYTICAL RESULTS
FOR THE FIRST AND SECOND ROUND SAMPLES (1)
NORTH CHICAGO REFINERS AND SMELTERS
NORTH CHICAGO, ILLINOIS

Sample Designation	NCMW3S2W	NCMW4S1W	NCMW4S2W	NCMW5S1W	NCMW5S2W
Remarks					
Sampling Round	Second	First	Second	First	Second
Sampling Date	1/92	11/91	1/92	11/91	1/92
Inorganics, ug/L					
Aluminum	NA	10,400.	NA	15,400.	NA
Antimony	30.4 U	-	-	-	-
Arsenic	15.4 J	3.3	2.3	8.2	10.1
Barium	655. J	85.5	202.	145.	786.
Beryllium	19.5 J	-	-	-	7. U
Cadmium	18. J	1.6 U	-	2.5 U	-
Calcium	NA	359,000.	NA	313,000.	NA
Chromium	362. J	42.5	118.	26.3	274.
Cobalt	81.6 J	14.2 U	54.2	17.7 U	129.
Copper	20,400. J	53.6 J	204.	148.	1,070.
Iron	NA	26,700.	NA	27,300.	NA
Lead	7,500. J	17.8	72.7 J	59.1	371. J
Magnesium	NA	160,000.	NA	13,300.	NA
Manganese	NA	2,010.	NA	2,390.	NA
Mercury	0.3 J	-	-	-	-
Nickel	482. J	79.7 R	155.	48.5 U	351.
Potassium	NA	9,800.	NA	7,380.	NA
Selenium	5.7 R	(5x) R	(5x) UL	(5x) R	UL
Silver	UL	8.9	-	5.3	-
Sodium	NA	140,000.	NA	110,000.	NA
Thallium	(5x) UL	UL	2. J	(5x) R	UL
Vanadium	189. J	23.1	103.	32.2	344.
Zinc	38,700. J	186.	592.	997.	5,310.
Boron	16,100. J	2,010. J	2,270. J	NA	5,750. J
Cyanide	UL	-	UL	-	UL
Tin	1,610. J	NA	90.7 U	NA	137.

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TABLE 7

TOTAL INORGANICS FOR SHALLOW MONITORING WELL WATER SAMPLES
SUMMARY OF VALIDATED ANALYTICAL RESULTS
FOR THE FIRST AND SECOND ROUND SAMPLES (1)
NORTH CHICAGO REFINERS AND SMELTERS
NORTH CHICAGO, ILLINOIS

Sample Designation	NCMW6S1W	NCMW6S2W	NCMW7S1W	NCMW7S1WB	NCMW7S2W
Remarks				Field Blank	
Sampling Round	First	Second	First	First	Second
Sampling Date	11/91	1/92	11/91	11/91	1/92
Inorganics, ug/L					
Aluminum	6,670.	NA	16,800.	48.	NA
Antimony	-	UL	85.3 U	-	108. J
Arsenic	3.7 J	3.5 J	23.8	-	47.4 J
Barium	68.2	181. J	250.	-	696. J
Beryllium	-	1.5 U	3.9	-	9. U
Cadmium	1.3 U	UL	51.4	1.8	140. J
Calcium	146,000.	NA	142,000.	90.2	NA
Chromium	30.2	91.4 J	140.	-	256. J
Cobalt	7.3 U	37.9 J	15.1 U	3.	40.5 J
Copper	160.	631. J	6,530.	3.7	21,500. J
Iron	14,600.	NA	32,800.	38.7	NA
Lead	53.3	177. J	3,610.	2. J	13,500. J
Magnesium	69,100.	NA	56,600.	54.5	NA
Manganese	474.	NA	1,780.	UL	NA
Mercury	-	UL	-	-	0.49 J
Nickel	38.9 U	134. J	114.	-	320. J
Potassium	5,170.	NA	23,900.	-	NA
Selenium	7.7 J	10.5 R	(5x) R	- R	UL
Silver	5.4	UL	9.7	-	8. U
Sodium	159,000.	NA	201,000.	236. J	NA
Thallium	(5x) UL	UL	(5x) UL	UL	(5x) UL
Vanadium	14.9 U	82.2 J	33.4	-	101. J
Zinc	268.	918. J	30,100.	5.5	86,700. J
Boron	6,210. J	9,810. J	10,100. J	65.3 J	10,800. J
Cyanide	-	UL	NA	-	UL
Tin	NA	74.9 U	NA	NA	2,810. J

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TABLE 7

TOTAL INORGANICS FOR SHALLOW MONITORING WELL WATER SAMPLES
SUMMARY OF VALIDATED ANALYTICAL RESULTS
FOR THE FIRST AND SECOND ROUND SAMPLES (1)
NORTH CHICAGO REFINERS AND SMELTERS
NORTH CHICAGO, ILLINOIS

Sample Designation	NCMW7S2WD	NCMW8S1W	NCMW8S1WD	NCMW8S2W	NCMW8S2WB
Remarks	Duplicate		Duplicate		Field Blank
Sampling Round	Second	First	First	Second	Second
Sampling Date	1/92	11/91	11/91	1/92	1/92
Inorganics, ug/L					
Aluminum	NA	6,880. J	8,420. J	NA	NA
Antimony	76.5 J	179.	194.	462. J	-
Arsenic	56. J	43.6	49.2	120. J	-
Barium	1,040. J	322.	337.	2,300. J	-
Beryllium	15. J	-	1.	UL	-
Cadmium	220. J	85.6	70.	134. J	-
Calcium	NA	213,000.	200,000.	NA	NA
Chromium	896. J	18.4	22.9	150. J	UL
Cobalt	65.3 J	11.7 U	10.4 U	40.5 J	-
Copper	38,900. J	10,000. J	12,600. J	56,700. J	5.4
Iron	NA	46,800.	43,200.	NA	NA
Lead	20,100. J	8,920. J	6,610. J	18,200. J	5.4 J
Magnesium	NA	100,000.	96,400.	NA	NA
Manganese	NA	2,480.	2,210.	NA	NA
Mercury	0.6 J	-	-	2.6 J	-
Nickel	615. J	122.	120.	439. J	-
Potassium	NA	45,600.	44,700.	NA	NA
Selenium	12.7 J	(5x) R	(5x) R	UL	UL
Silver	23.2 J	6.4	5.8	17.6 J	-
Sodium	NA	456,000. J	444,000. J	NA	NA
Thallium	(5x) UL	(5x) R	(5x) R	(5x) UL	UL
Vanadium	151. J	13.8 U	15.3 U	86.8 J	-
Zinc	138,000. J	41,000.	39,100.	94,000. J	7.6
Boron	10,700. J	9,930. J	9,780. J	10,000. J	- R
Cyanide	UL	-	-	UL	-
Tin	4,320. J	NA	NA	7,680. J	-

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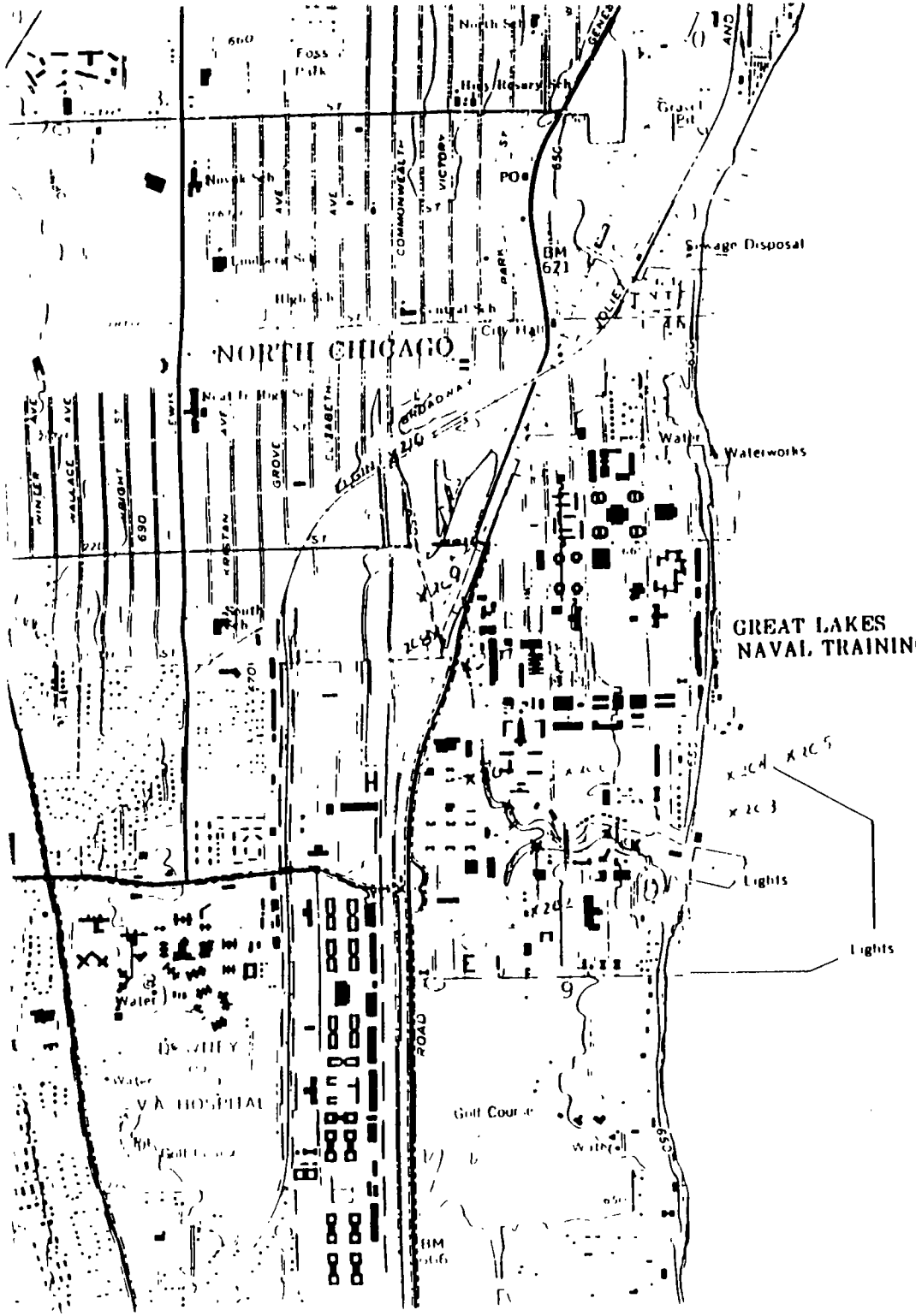

Approximate Sample Locations (Pettibone Creek) collected during CERCLA Expanded Site Inspect. of NCR + S

4-26-94

RECEIVED
IL ENVIRONMENTAL PROTECTION
FEB 1 1995
DIV. WATER POLLUTION CONTROL
Field Operations Section - Reg. 2

LAKE MICHIGAN

APPROXIMATE MEAN LAKE ELEVATION 580

NORTH CHICAGO
Novak Sch
Lindberg Sch
High Sch
Central Sch
City Hall
PO
BM 671
Sewage Disposal
Neal Jr High Sch
South Sch
Water
Waterworks
GREAT LA
NAVAL TR
Lights
Water
16TH
18TH
ST
AVE
COMMONWEALTH
VICTOR
PARK
JOLIET
BROADWAY
ELGIN
ELIZABETH
GROVE
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